1EW03 – Enabling Works Central

AWH Location Specific Written Scheme of Investigation for Archaeological Recording at Thorpe Mandeville, Northamptonshire AC310

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1 Executive Summary

1.1.1 This Location-Specific Written Scheme of Investigation (LS-WSI) details the means by which a scheme of Archaeological Recording at two mitigation areas and Construction Integrated Recording at one area at Thorpe Mandeville (site code TBC) (the "site") will be delivered and resourced, the methodology, health, safety and environmental requirements and identifies the timescales and proposed programme for the works. This LS-WSI is based on the Project Plan for Archaeological Recording (Doc No: 1EW03-FUS-EV-REP-CS07_CL25-002576, prepared by Fusion, Appendix A). The Project Plan designs the works in response to specific HS2 objectives and the LS-WSI is the delivery vehicle, providing details of programme management, cost control, resourcing, Health and Safety and Reporting.

1.1.2 The works covered by this LSWSI comprise:

- Archaeological Recording at C31034 (0.55ha) & C31035 (0.67ha)
- Construction Integrated Recording at C31039 (0.25ha).

1.1.3 The Site is located in Northamptonshire, within the Greatworth to Lower Boddington Community Forum Area (CFA15). Previous trial trench evaluation including Areas C31034, C31035 & C31039 had identified two Mid-Late Iron Age enclosures and an enclosure of Early Roman date (1EW03-FUS-EV-REP-CS07_CL25-002559). Preceding geophysical survey of this wider site suggested the potential for a series of linear features between these enclosures, which were largely unconfirmed by the evaluation results (C252-ETM-EV-REP-020-000152_P03). This LSWSI is focussed on the further archaeological investigation of the two Mid-Late Iron Age enclosures and their immediate surroundings. The Early Roman enclosures will be investigated through a phase of CIR.

1.1.4 The Archaeological Recording & Construction Integrated Recording is required to further investigate and record the archaeological remains identified at the Site by the previous investigations, contributing to the following specific GWSI: Historic Environment Research and Delivery Strategy (HERDS) objectives:

- KC15: Can we identify regional patterns in the in the form and location of Late Bronze Age and Iron Age settlements across the route, and are there associated differences in landscape organisation and enclosure?
- KC18: Explore the evidence for increasing social complexity in the archaeological record in the Late Bronze Age and Iron Age, and identify patterns of intra-regional and regional variation;
- KC21: Assess the evidence for regional and cultural distinctiveness along the length of the route in the Romano-British period, with particular regard to the different

settlement types encountered along the route;

- KC40: Identify patterns of change within medieval rural settlement from the 11th to mid- 14th century; and
- KC47: Test and develop geophysical survey methodologies.

1.1.5 This LSWSI has been prepared in accordance with the standards and guidance provided by the GWSI: HERDS, the Technical Standards for Specification for historic environment project plans and location specific written schemes of investigation (Document No. HS2-HS2-EVSTD-000-000036) and Specification for Historic Environment Investigations (Document No. HS2-HS2-EV-STD-000-000035), Standards & Guidance for Field Evaluation (CIfA 2014b), Standard and Guidance for Archaeological Excavation (CIfA 2014c) and Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives (CIfA 2014d).

2 Site Location, Extent and Condition

2.1 Project Background

2.1.1 High Speed Two (HS2) is a new railway network proposed by Government to provide a new link between London, the West Midlands, the East Midlands, South Yorkshire, Leeds and Manchester. Phase One of HS2 will involve the construction of a new railway approximately 230km (143 miles) in length between London and the West Midlands. Powers for the construction, operation and maintenance of Phase One are conferred by the High Speed Rail (London - West Midlands) Act 2017.

2.1.2 The overall framework within which archaeological work will be undertaken is set out in the Environmental Minimum Requirements (EMR), in particular the Heritage Memorandum, the Code of Construction Practice (CoCP) for HS2 Phase One and the GWSI: HERDS. Accordingly, the nominated undertaker or the *Enabling Works Contractor* is required to implement appropriate and reasonable measures to identify, avoid or, where practicable, reduce impacts to the significance of heritage assets prior to the start of construction.

2.2 Site Location

2.2.1 The Site is located within CFA15 Greatworth to Lower Boddington Community Forum Area, in the county of Northamptonshire in the historic parish of Boddington. The Site is located c.730m east of the village of Thorpe Mandeville and c. 1.6km south-west from Sulgrave. The Site comprises three parcels of land, encompassing a total of 1.47ha:

- C31034 (NGR centre 453993, 244793) measuring 0.55ha;

- C31035 (NGR centre 454105, 244635) measuring 0.67ha; and
- C31039 (NGR centre 454340, 244880) measuring 0.25ha.

2.3 Geology and Topography

2.3.1 The Areas of the Site comprise parts of land currently in arable use, to the south of Banbury Road, which forms the northern boundary of Areas C31034 & C31039. Area C31034 lies approximately 100m north from Area C31035, the two divided by an east/west aligned stream, marked by a steep declivity and mature vegetation. These Areas sit on slight slopes declining towards this feature, between c. 160-165m above Ordnance Datum. Area C31039 lies c. 240m east from Area C31034, on level ground.

2.3.2 The British Geological Survey (BGS Online 2020) indicates that the underlying solid geology within the Site comprises sandstone, limestone and ironstone of the Northampton Sand Formation formed in shallow seas of the Jurassic Period (170-174 million years ago). There are no superficial deposits recorded within the Site.

2.3.3 The Geo-archaeological Desk-Based Assessment prepared as part of the Environmental Statement (1D037-EDP-EV-REP-000-000031) places the Site within Geological Character Zone (GCZ) 20 Thorpe Mandeville to Edgecote. This GCZ has been highlighted as having limited geo-archaeological potential due to the lack of recorded superficial deposits.

2.3.4 During the trial trench evaluation (1EW03-FUS-EV-REP-CS07_CL25-002559), Northampton Sand Formation was confirmed as the present bedrock geology, interspersed with pockets of sandy silt and variable densities of ironstone and mudstone. A sandy/silty subsoil was also encountered, varying in thickness between 0.08m and 0.4m, sealing the archaeological features. A uniform topsoil layer, varying between c. 0.06m and 0.42m in thickness, was recorded above the subsoil. No alluvial/colluvial layers were recorded within those trenches closest to the stream situated between Areas C31034 & C31035.

2.4 Current Site Conditions & Constraints

2.4.1 This Site lies adjacent to the public highway and is currently either pasture or fallow. Movement within the Site will be via existing field gates and access will be confirmed with Fusion, prior to any work commencing.

2.4.2 Land parcel specific constraints/hazards include:

- Badger sets
- Potential bat roosts
- Historic hedgerows

- Existing watercourse

2.4.3 Existing badgers setts are currently being vacated. A replacement badger sett is located to the south-west of C31034 which will be adjusted in its SW corner to take account of the 30m disturbance buffer. In order to protect badgers against falling into stripped areas, ramps will be left in excavation edges. Each area will also be checked for badgers daily prior to starting work.

2.4.4 The parish boundary (GLB069) running along the eastern boundary of the Site is followed by a hedgerow that is considered historically important under the Hedgerow Regulations 1997. Appropriate measures will be implemented to avoid disturbing these features during the evaluation (including the use of clearly visible exclusion zones).

2.4.5 A watercourse running on a rough west to east axis separates the northern and southern recording areas. A buffer of 8m will be established from this watercourse in which no excavation or spoil storage will be undertaken. An existing crossing point will be used to pass between the two areas

2.4.6 The Unexploded Ordnance risk has been checked on the gViewer by the *Designer* and checked by the *Contractor* and has been designated as low risk for this Site.

2.5 Archaeological Background

2.5.1 The archaeological background and context of the Site is described in Section 2.2 of the Project Plan and is summarised below.

2.5.2 No designated heritage assets are recorded within the Site or its near vicinity.

2.5.3 The Site encompasses parts of two Archaeological Sub Zones (ASZ) identified within the Environmental Statement (ES) (CH-001-015), comprising:

- ASZ 15-10 Dean Barn Plateau; and
- ASZ 15-11 Costow Valleyside.

2.5.4 No Palaeolithic, Neolithic or Mesolithic remains have been identified within the site. Isolated flints of Mesolithic and later date have been discovered in the broader area. Similarly, other finds of Neolithic and later date provide general indications of prehistoric activity in the locality.

2.5.5 Evaluation trenching undertaken previously has identified Iron Age activity, principally characterised by the evidence of enclosures and fragments of field systems within Areas C31034 & C31035 (GLB235, 236, MNN140085). In Area C31034, the geophysical survey identified a D-shaped enclosure (c. 50m by 35m), containing a broken ovoid form (c. 14m by 11m) and several discrete anomalies (C252-ETM-EV-REP-020-000152_P03, Figures 4a & 4b).

Further discrete anomalies were detected to the east of this enclosure, along with a curvilinear form with two branches. Trenches 046, 047 & 048 of the trial trench evaluation confirmed the presence of the D-shaped enclosure, excavating three sections to a basal depth of 0.31-0.51m deep (1EW03-FUS-EV-REP-CS07_CL25-002559, Figure 4b). The ditch was found to contain a single fill comprising sandy, gravelly silt. In terms of artefactual remains, a single sherd of modern pottery was recovered from the feature, believed to be intrusive. A single pit was excavated within Trench 049, targeting an anomaly identified within the ovoid form. This pit was excavated to a depth of 0.5m at its base and found to contain charcoal flakes, fragments of fired clay, a bone fragment, four pottery sherds and a possible loom or thatch weight, attributed to the Mid-Late Iron Age. This has been provisionally interpreted as a storage or waste pit. The enclosing ovoid form identified by geophysical survey had been provisionally interpreted as a hut circle, however the structure was not confirmed during the trenching.

2.5.6 Of the remaining geophysical anomalies identified within Area C31034, the curvilinear feature to the east of the D-shaped enclosure was confirmed in Trench 045, but not in Trenches 044 or 047. This was found to be 0.21m deep, containing a single fill of sandy silt and no artefactual evidence. The branching part of this feature suggested by the geophysical survey was not confirmed within Trench 045. Furthermore, discrete features targeted within Trenches 045, 048 & 049 were not confirmed, excepting the aforementioned pit within the ovoid form.

2.5.7 Within Area C31035, the geophysical survey highlighted numerous linear, curvilinear and discrete anomalies, interpreted as potential field enclosure boundaries and associated pits or postholes (C252-ETM-EV-REP-020-000152_P03, Figures 4a & 4b). Few of these were confirmed by the trial trench evaluation (1EW03-FUS-EV-REP-CS07_CL25-002559, Figure 4). In Trench 103, a section of a ditch was excavated to a basal depth of 0.32m, filled with gravelly silt and containing no artefactual evidence. A section of a similar feature was excavated slightly to the south, within Trench 106, also containing no artefactual remains. Three features were excavated within Trench 113, comprising a ditch and later recut, a smaller ditch or gully, and an ovoid pit. The ditch and small ditch/gully correlated to anomalies identified by the geophysical survey. Only the pit contained any artefacts, comprising 56 pottery sherds dating to the Mid-Late Iron Age. This feature was not identified by the geophysical survey. Few of the anomalies identified by the geophysical survey were confirmed during the trial trench evaluation and these principally lay beyond areas of interpreted geological responses (Figure 4b). Many geophysical anomalies beyond these areas of geology, however, were also not encountered during the trenching. It must also be noted that the potential enclosures identified within Areas C31034 and C31035 have been attributed to the Mid-Late Iron Age only through association with artefacts recovered from nearby pit features and may, therefore, in actual fact be associated with other periods. The variability of the colour and composition of the recorded fills also offers little suggestion as to the contemporaneity of the linear features with the Iron Age pits.

2.5.8 In addition to the pottery assemblage, three pieces of possibly struck flint were recovered during the trial trench evaluation. One piece was retrieved during test pitting of the topsoil in advance of the excavation of Trench 032/033 and two further pieces each within an undated ditch in Trenches 054 and 095.

2.5.9 The third enclosure identified by geophysical survey comprised a series of linear and curvilinear anomalies surrounding smaller similar features and possible pit-like forms, bisected by Banbury Road (Figure 4a). Subsequent trenching confirmed several of these linear forms within Trenches 032-3, 035-6 & 054, although several others were not confirmed. The recovery of ten Romano-British pottery sherds from two ditches in Trenches 035 & 036 led to the conclusion that these features represented a series of Early Roman enclosures, possibly a small farmstead (GLB237, 1EW03-FUS-EV-REP_CS07_CL25-002559). Several of the undated features within close proximity of these dated features may feasibly be contemporary to this period.

2.5.10 No confirmed medieval remains are known to exist within the site, with the exception of the historic parish boundary that runs between the area of C31034 and C31039. Geophysical survey and subsequent trial trench evaluation including the Site recorded numerous undated features (C252-ETM-EV-REP-020-00152_P03, 1EW03-FUS-EV-REPCS07_CL25-002559, Figures 4a & 4b). A linear feature undetected by the geophysical survey was excavated within Trench 116, c. 110m south-east from the Site, attributed by its alignment to relate to adjacent medieval ridge and furrow earthworks (Figure 4b). Several additional features excavated during the evaluation were also attributed provisional medieval origins, including a possible leat c. 100m north from the Site (identified in Trenches 015, 016, 017 and 022), however, none of these contained any dateable evidence. Only two sherds of possible late medieval (AD 1450-1600) pottery were recovered, from the topsoil or subsoil of Trenches 057 and 058, to the immediate south of Area C31034.

3 Overview of Project Plan

3.1.1 This LS-WSI has been prepared to provide the necessary specification and site-specific information to enable the delivery of the archaeological mitigation as defined the Project Plan for Archaeological Recording. The Project Plan defines the scope of the recording, outlines its aims and how they will contribute to the specific objectives laid out in the GWSI: HERDS, and describes the proposed deliverables and reporting mechanisms. The Project Plan should be referred to for detailed information on these matters (see Appendix A).

3.2 Aims and Objectives

Aims of the Fieldwork

3.2.1 The specific aims of the Archaeological Recording across Areas C31034-5 are:

- To confirm and record the presence, extent of any Mid-Late Iron Age settlement/agricultural activity or medieval activity;
- To provide further understanding of the undated features across the Site and establish a date for their use;
- To understand the impact of the later phases (medieval/post-medieval) of agricultural activity on those of an earlier date; and
- To contribute to the delivery of GWSI: HERDS Specific Objectives as specified in Section 4.2.

3.2.2 The specific aims of each of the areas of Archaeological Recording are as follows:

- Area C31034: geophysical survey has identified a D-shaped enclosure within this Area, in addition to numerous anomalies possibly representing linear forms of a field system and discrete pit features. Trial trench evaluation confirmed the D-shaped enclosure in several trenches (Nos. 046, 047 & 048). Further discrete and linear forms, suggested by weaker geophysical responses, were confirmed in one trench (No. 045) and apparently absent in others. The Archaeological Recording will enable closer investigation of the D-shaped enclosure and the potential for further remains within. A closer examination of the anomalies identified by geophysical survey will also be afforded, allowing the potential for an adjacent Mid-Late Iron Age field system to be explored; and
- Area C31035: Numerous linear anomalies were highlighted by geophysical survey within this Area, some appearing as rectilinear forms possibly indicative of enclosures and field division. Several discrete anomalies were also identified. Subsequent trial trench evaluation was unsuccessful in confirming many of the anomalies and a pit encountered within Trench 113 was not identified by the geophysical survey. The Archaeological Recording will allow closer examination of this area of dense geophysical anomalies and enable their verification or otherwise, also exploring the potential for hitherto unidentified features.

3.2.3 The specific aims of the Construction Integrated Recording across Area C31039 are:

- To confirm and record the presence, extent of any Roman settlement/agricultural activity;
- To provide further understanding of the undated features across the Site and establish a date for their use;
- To understand the impact of the later phases (medieval/post-medieval) of agricultural activity on those of an earlier date; and

- To contribute to the delivery of GWSI: HERDS Specific Objectives as specified in Table 1 below and in Section 4.2 of the Project Plan.

3.2.4 A series of linear and curvilinear anomalies, enclosing further such forms and pit-like discrete anomalies, was identified within Area C31039 during a phase of geophysical survey in 2014. Subsequent trial trench evaluation confirmed the presence of several of these features and recovered ten sherds of Roman-British pottery from two excavated ditch sections, in Trenches 035 & 036. The CIR will enable further investigation of the undated features and of those anomalies previously unidentified through intrusive investigation, also exploring the potential for hitherto unidentified features.

Table 1 Contribution to HERDS Objectives

Specific Objective	Contribution
KC15: Can we identify regional patterns in the form and location of Bronze Age and Iron Age settlements across the route, and are there associated differences in landscape organisation and enclosure?	Several features within the Site, including a D-shaped enclosure, have been attributed Mid-Late Iron Age origins. Any further evidence has the potential to contribute to our understanding of landscape exploitation along the route during the Iron Age. Evidence of settlement will allow comparison of the form and location of associated features to be compared with other sites along the route.
KC18: Explore the evidence for increasing social complexity in the archaeological record in the Late Bronze Age and Iron Age, and identify patterns of intra-regional and regional variation.	Further evidence associated with the Mid-Late Iron Age remains recorded by the trial trench evaluation may offer evidence of variation along the route. Factors may include field and enclosure types, associations with settlements and other known sites, duration of use and associated activity.
KC21: Assess the evidence for regional and cultural distinctiveness along the length of the route in the Romano-British period, with particular regard to the different settlement types encountered along the route.	The presence of Early Roman activity was confirmed within Area C31039 by the recovery of ten sherds of Roman-British pottery in two excavated ditch sections. It is likely that the presently undated associated linear forms are contemporary to the Roman period and have the potential to contain further artefactual remains. Further investigation would allow the type of settlement here to be characterised and compared with others encountered along the route. The results may also indicate the chronology of settlement at this location, including duration, hiatuses and abandonment.
KC40: Identify patterns of change within medieval rural settlement from the 11th to mid-14th century.	A combination of cartographic records, geophysical survey and visual inspection has identified a shallow, linear feature within Area C31035 relating to the medieval township boundary of Costow. Investigation of this feature may allow a further understanding of the physical form and purpose of such features and any

Specific Objective	Contribution
	artefactual or ecofactual remains may be used to infer periods of use and disuse.
KC47: Test and develop geophysical survey methodologies.	The Site and its environs have been subject to a series of remote sensing and geophysical surveys, which produced varying results including clear concentrations of archaeological features, but also areas where magnetic noise may be masking any potential archaeological remains and anomalies of uncertain potential. It has been interpreted that many of the geophysical anomalies represent "ghost" traces of features within the topsoil, detected by geophysical survey but difficult to discern during the excavation of trenches. The archaeological recording has the potential to further ground-truth these results and help develop non-intrusive archaeological prospection techniques.

4 Programme

4.1.1 The works are expected to begin in December 2020. The proposed programme of works is given in the table below:

Activity	Start Date
Submission of LS-WSI	23/11/20
Approval/Finalisation of LS-WSI	4/12/20
Install temporary welfare compound and fencing to whole site	30/11/20-9/12/20
Topsoil stripping C31034	9/12/20 for 6 days
Commencement of excavation of C31034	14/12/20
Topsoil stripping C31035	15/12/20
Commencement of excavation of C31034	4/12/20
Backfilling	15/2/21 for 3 weeks
Reporting	15/2/21 for 6 weeks
Archiving	To be confirmed

5 Specific Method Statements

5.1 Project Scope

5.1.1 The scope and method for the trial trench evaluation is set out in Section 4 of the Project Plan. This section of the LSWSI develops that methodology to provide clear site specific methodologies and information to enable the Archaeological Contractor to successfully deliver the programme of archaeological evaluations.

5.1.2 The Archaeological Recording comprises two areas totalling 1.23ha (Table 2, Figure 8), laid out using reconnaissance information gathered during the course of the ES, remote sensing and geophysical surveys and the subsequent phase of trial trench evaluation. This evidence led approach also draws on site-specific and local topographical and geological information and known areas of past human activity within the immediate vicinity:

- Area C31034: Positioned over the D-shaped enclosure identified by the geophysical survey and confirmed by the trial trench evaluation and other 'features', mostly unverified (Trial trench nos. 045, 046,046, 048 & 049). Extending sufficiently to the south, east and west to capture any peripheral associated remains;
- Area C31035: Positioned to encapsulate a dense concentration of anomalies identified by geophysical survey, provisionally interpreted as evidence of field systems. Few of these anomalies were confirmed by the trial trench evaluation Nos. 103, 106 & 113). Extending to further investigate anomalies in 'several blank' trenches, including two parallel linear forms (Nos. 101, 102, 104, 105, 107 & 112).

5.1.3 The Areas for Archaeological Recording have been determined based primarily on the results of the trial trench evaluation. Should the results of the geophysical survey reflect the archaeological presence with greater accuracy than confirmed in the results of the evaluation, or archaeological remains of interest are found to extend beyond the limits of the excavated Areas, an additional contingency of up to 480m², equating to 4% of overall Site area, will be excavated to further investigate and characterise significant or unexpected remains. Any contingency excavation will only be carried out following approval by the *Contractor*.

5.1.4 All Archaeological Recording areas listed in Table 2 have been assigned a unique ID in accordance with the Employer's Asset Information Management System (AIMS).

5.2 Construction Integrated Recording Scope

5.2.1 The Construction Integrated Recording (CIR) will be undertaken in accordance with specific guidance produced by HS2, in particular the Technical Standard Specification for historic environment investigations (HS2-HS2-EV-STD-000-000035) and the GWSI: HERDS (HS2-HS2-EV-STR-000-000015).

5.2.2 The CIR comprises one area totalling c.0.25ha (Table 2, Figure 8), laid out using reconnaissance information gathered during the course of the ES, remote sensing and geophysical surveys and the subsequent phase of trial trench evaluation and also addressing the construction impacts (i.e. the topsoil stripping of the MWC compound). This evidence-led approach also draws on site-specific and local topographical and geological information and known areas of past human activity within the immediate vicinity:

- Area C31039: Positioned over the collection of linear and curvilinear forms identified by geophysical survey to the south of Banbury Road. Confirmed in part through subsequent trial trench evaluation (Trenches 032-3, 035-6 & 054), the recovery of ten sherds of Romano-British pottery from two excavated ditch sections has led to the provisional conclusion that these features represent an Early Roman farmstead or part of a field system.

5.2.3 The extent of the area for CIR has been determined based on designs for the placement of a temporary construction compound at this location. Should the current designs alter in extent, the coverage of the CIR will be adapted to reflect these changes. Any change to the area of CIR will be carried out following approval by the *Contractor*.

5.2.4 The CIR area listed in Table 2 has been assigned a unique ID in accordance with the Employer's Asset Information Management System (AIMS).

Table 2 - Schedule of Archaeological Recording Areas

AIM ID.	Area ID	Length	Tr. Width	Max Trench Depth	Objectives/Comments
	C31034	100m	c50m	To natural geology	Targeted to investigate the Mid-Late Iron Age D-shaped enclosure, its interior and external associations.
	C31035	c. 110m	c. 80m	To natural geology	Targeted on a dense nucleation of linear and discrete geophysical survey anomalies, only a few of which were confirmed through intrusive investigation. May represent field systems, enclosures and/or structural remains associated with the nearby Mid-Late Iron Age evidence.
	C31039	c. 85m	c. 48m	To natural geology	Targeted on a concentration of geophysical survey anomalies, only partly confirmed by intrusive investigation. Features may include parts of field systems, enclosures and/or

AIM ID.	Area ID	Length	Tr. Width	Max Trench Depth	Objectives/Comments
					structural and occupation remains associated with Roman activity.

5.2.5 The following sections address detailed issues of methodology, the proposed approaches to data collection, and project delivery.

5.3 General methodology

5.3.1 The scope and method for the archaeological recording are set out in Section 4 of the Project Plan. This section of the LSWSI develops that methodology to provide a clear site specific methodology and information to enable the *Archaeological Contractor* to successfully deliver the programme of archaeological evaluation at each site.

5.3.2 All archaeological works will be carried out in accordance with the Project Plan, this LSWSI and any further instructions from the *Contractor*. This design takes account of the guidance and specifications set out in the HS2 Phase One EMRs, CoCP, GWSI: HERDS and Technical Standards principally the Technical Standard Specification for historic environment investigations (Document No. HS2-HS2-EV-STD-000-000035), and the guidance provided by the Chartered Institute for Archaeologists (CIfA) Code of Conduct (CIfA 2014a) and the Standard and Guidance for Archaeological Field Evaluation (CIfA 2014b).

5.3.3 Prior to the start of the works a site meeting and walkover will be held between the *Contractor* and the *Archaeological Contractor* to confirm that each of the works locations remain accessible and clear of obstruction. Access routes, safe working areas and any constraints to the trial trenching works will also be identified.

5.3.4 The *Archaeological Contractor* shall ensure that the archaeological investigations are undertaken in an organised, efficient and professional manner. The *Archaeological Contractor* shall therefore have full regard for the safety of all personnel on site, including measures to ensure the safety of all, including any effects the archaeological evaluation may have on the daily operations of the landowner, other contractors engaged in the construction of HS2 Phase One and members of the general public.

5.3.5 The on-site archaeological recording and recovery techniques will be in line with the methods set out in the Project Plan, this LSWSI and current industry best practice and should be fully understood by all.

5.3.6 All paper and digital records made during the course of the archaeological evaluation, and the treatment of artefacts and environmental remains, will be reviewed continuously.

Record checking and collation will be completed at regular intervals, as appropriate, and before an area is considered complete, abandoned, backfilled or the site closed. Errors or omissions in recording discovered during post-excavation cannot be recovered. The *Archaeological Contractor* must make suitable allowance for this task.

Site Access

5.3.7 The Site is located within mixed arable and pastoral land and will be accessible from the road network without the need for vegetation clearance. Field boundaries within the site have existing gateways allowing access for vehicles and pedestrians.

Site Set-up

5.3.8 Prior to the start of the archaeological evaluation the *Archaeological Contractor* will attend a pre-works site meeting with the *Contractor's Historic Environment Manager*. The purpose of this meeting will be to allow the *Archaeological Contractor* confirm the access points, ground conditions, site specific hazards and to agree the location for the welfare facilities and the storage of plant and materials.

5.3.9 Site set-up will be conducted following the relevant guidance set out in the Enabling Works Information WI0200 General Constraints (Document No. 1E001-HS2-PR-ITT-000-000098) in particular Sections 6 *Construction site layout and good housekeeping* and in accordance with the Fusion-approved RAMS, CLP and LP.

5.3.10 Fencing (*e.g.* pedestrian barriers subject to Fusion approval) will be erected around trenches where appropriate, with the type of fencing being dependent on the depth of the trench. The temporary fencing will be regularly inspected and maintained until the archaeological works have been completed.

5.4 Setting Out

5.4.1 All spatial setting out and recording shall be in accordance with The Ordnance Survey (OS) National Grid and OS Newlyn Datum (ODN) as defined by the OS Active Global Navigation Satellite System (GNSS) network and use a Virtual Reference System (VRS). In each area of excavation, a minimum of three Permanent Ground Markers (PGM) shall be created using this system.

5.4.2 Each area of excavation shall be located to a horizontal accuracy of +/– 0.5m. The corner points of each area shall be set out with Real Time Kinematic (RTK) GNSS equipment or other suitable automated equipment referenced from the PGMs.

5.4.3 Surface heights shall be recorded using RTK GNSS and related to PGMs. OS Benchmarks (OSBM) are not to be used. Levelling accuracy shall be within 0.1m Ök: where 'k' is the total distance levelled in kilometres.

5.4.4 All excavation limits and significant archaeological detail are surveyed 'as dug', in relation to the project grid before leaving the mitigation areas. Ground level height data to Ordnance Datum (OD) shall be recorded for each excavation area, along with the levels of the top of the superficial deposits (where present) or the top of the solid geology. Levels of key archaeological horizons and features will also be recorded.

5.5 Mechanical Excavation

5.5.1 All machine excavation will comply with the *Employer*'s Technical Standard – Soil Handling for Land Restoration (HS2-HS2-EV-STD-000-000008). A Soil Management Plan (SMP) will be produced in compliance with relevant technical standards. This will require submission to the *Contractor* and must be approved before works can commence on Site.

5.5.2 Stripping works will commence using mechanical excavators fitted with toothless grading buckets. Machining shall be carried out in spits under the supervision of the archaeological contractor. Machine excavation will comply with the Employer's Technical Standard - Route wide soil resources plan (HS2-HS2-EV-STD-000-000008). Any variations to the excavation methodology will be reported to DJV in advance, who will consult with HS2 historic environment team should it be deemed necessary. Significant changes in mechanical excavation will be agreed with the Employer, may be presented as an addendum to the LS-WSI and will be recorded in post-ex reporting. It is the responsibility of the archaeological subcontractor to ensure that the finished surface is machined to a suitable 'archaeologically clean' level, in order to identify, define and investigate any exposed archaeological features or deposits. If it is not possible to attain a sufficiently clean surface, hand cleaning will be required.

5.5.3 Machining shall be carried out under the constant supervision of a suitably qualified archaeologist to excavate the ground in spits. The *Archaeological Contractor* shall use their professional judgement to determine the appropriate depth of each spit. Any variations to the excavation methodology shall be carried out following consultation with the HERDS manager and recorded in writing for inclusion in the final report. Each spit shall be examined carefully to assist the recovery of any archaeologically significant artefacts and thus to determine when to cease machining. It is the responsibility of the *Archaeological Contractor* to ensure that the finished surface is machined to a suitably 'clean' state in order to identify, define and investigate any exposed archaeological deposits. If the surface is not sufficiently clean, hand cleaning of the surface will be required. Machine excavation will comply with the *Employer*'s Technical Standard - Route wide soil resources plan (Document No. HS2-HS2-EV-STD-000-000008).

5.5.4 The *Archaeological Contractor* shall ensure that water is discharged and excavated material from archaeological excavations are stored in accordance with the *Contractor's* environmental protection requirements (as set out in the package Works Information and their

Environmental Management Plan) and any relevant consents for the worksite. The *Contractor* shall monitor discharge rates and, if necessary, conductivity of discharge waters to ensure compliance.

5.5.5 In the event that deep stratigraphy is encountered, such as alluvial or colluvial sequences, sondages will be machine excavated within trenches. Each intervention shall be excavated to the base of the stratigraphic sequence and shall be appropriately shored and kept free of water to allow 'person entry' to the excavations i.e. to allow the *Archaeological Contractor* to undertake investigation and recording to fulfil the aims of the work. The *Archaeological Contractor* will ensure that all works undertaken in deep stratigraphy will comply with the *Employer's* Technical Standard – Temporary Works (Document No. HS2-HS2-CV-STD-000-000005).

5.5.6 Where sondages into alluvium are unsafe to enter the *Archaeological Contractor* shall direct excavation in a manner that will allow excavated sediments to be adequately sampled and interpreted by the geoarchaeologist. Material to be sampled will be placed by the excavator at a safe distance from both the sondage and plant and scanned for finds. The sedimentary sequence will be recorded by the *Archaeological Contractor's* geoarchaeologist according to standard conventions (HE 2015) to include sediment structure, colour, texture, sorting and any identifiable boundary characteristics. Depths of each stratigraphic boundary will be recorded, or where full access is unsafe estimated and recorded as such. Buried soils will be inspected and recorded by the *Archaeological Contractor's* geoarchaeologist to provide data for understanding formation processes. Procedures and techniques for this data capture will be as outlined in Historic England guidance on geoarchaeology and environmental archaeology (HE 2011 & 2015). Samples for laboratory assessment, analysis and dating shall be collected where appropriate following agreement with the *Contractor's Historic Environment Manager* and the *Employer.* Any trenches exceeding 1.2m in depth will be excavated in accordance with a Temporary Works Design, prepared by Connect and approved by Fusion.

5.5.7 Should any material be excavated that is deemed to be contaminated or potentially contaminated it shall be investigated, controlled (e.g. placed separately from clean material) and removed from the site in accordance with the *Contractor's* environmental protection requirements (as set out in their Environmental Management Plan).

5.5.8 On completion of the topsoil strip in each area, the *Archaeological Contractor* and Fusion's HERDS Manager shall meet on site to agree the sampling strategy for the excavation works and to refine the excavation cost estimate.

5.6 Soil Storage

5.6.1 Topsoil and subsoil arising from the mechanical excavation of the Archaeological Recording areas will be stockpiled separately, either adjacent to or in the immediate vicinity of each excavated area. All soil storage will be done in compliance with the *Employer's* Technical Standard, Route Wide Soil Resource Plan (HS2-HS2-EV-STD-000-000008). A Soil Management Plan will be produced by the *Archaeological Contracto*r prior to the commencement of works and submitted to the *Contractor* for agreement and approval. Works cannot proceed without approval of this document.

5.6.2 The *Archaeological Contractor* shall consult with the *Contractor* to agree the location of the soil storage areas during preparation of the Soil Management Plan and RAMS documentation. The *Archaeological Contractor* will estimate the volume of each stockpile and will provide a drawing clearly showing the location of each soil store.

5.7 Surface Cleaning

5.7.1 Where necessary, stripped surfaces will be cleaned by hand, using trowels or hoes.

5.7.2 Wherever possible, spoil arising during hand-cleaning will be stockpiled beyond the limits of excavation; where those limits are too distant to make off-site storage practicable, spoil will be stored in areas of natural geology away from any archaeological features.

5.7.3 The stripped surface in the immediate vicinity of features will be kept clean and free of loose spoil until excavation of the area is complete and signed off.

5.8 Hand Excavation

5.8.1 Archaeological Recording shall be undertaken by the *Archaeological Contractor* to the general requirements as described in the GWSI: HERDS. A sufficient sample of the archaeological features and deposits revealed must be sampled/or fully excavated to allow the resolution of the aims and objectives of the work. Structures, features or finds which might reasonably be considered to merit preservation in situ, bearing in mind the construction requirements of the site, shall not be unduly damaged.

5.8.2 Where areas of extensive archaeological stratification are encountered, the horizontal and vertical extent of archaeological stratification shall be assessed by the *Archaeological Contractor* through implementation of an appropriate strategy. The aim shall be to recover suitable stratigraphic, finds and environmental samples from the Site as far as is practicable. The exact methodology may need to be determined by the *Archaeological Contractor* during the excavation of individual features and agreed with the *Employer*.

5.8.3 Where deposits are investigated and found to be undated, and where these have the potential to be of archaeological significance (e.g. of earlier prehistoric or early medieval date, or any

other deposit types notable for artefactual scarcity) appropriate samples should be taken for artefact recovery. The soil should be hand excavated and then sieved or screened through or 6mm wire mesh to recover artefacts. Samples will ideally be sieved on site.

5.8.4 In order to protect any waterlogged remains during the works, the *Archaeological Contractor* may identify a requirement for excavations to be allowed to refill with water overnight. In such cases, the *Archaeological Contractor* shall ensure that any hazards to staff or third parties are minimised.

5.8.5 It is envisaged that an appropriate sample of all archaeological features uncovered during the Archaeological Recording will be excavated in order to maximise the retrieval of artefactual and ecofactual data required to address the aims and objectives set out in Section 4, as detailed in Table 3. This may be subject to change at the discretion of the *Archaeological Contractor* as appropriate during the Archaeological Recording. Any changes must be done with the agreement of the Contractor as a minimum, as well as the *Employer* where appropriate.

Table 3 – Sample of Archaeological Features to be Excavated

Type	Description	% to be excavated
Linear features (main body)	Agricultural	10%
Linear features (main body)	Non-structural settlement, industrial, funerary	10%
Linear features (main body)	Structural settlement, industrial, funerary	100%
Linear features (bends, termini)	All types	100%
Linear features	large "enclosure" ditch	25% to full depth
Discrete features	Pits/postholes - undated	50%
Discrete features	Pits/postholes - IA/RB	100%

Discrete features	Large Pits	50%
Discrete features	Large Pits IA/RB	100%
Deep features	wells/water pits	50%
Post-fast structures	Fences/buildings	100%
Stone, masonry structures	walls/buildings	50%
Stone, masonry structures	surfaces	25%
Other structures	ovens/kilns/hearths	100%
Funerary	Human, animal	100%
Layers	Agricultural, settlement	Under discrete judgement of the Supervisor
Discrete special deposits	Settlement, industrial, funerary (e.g. middens, industrial waste, pyre deposits	100%
Intersections	All types of feature/deposit	Typically 50% of each intersection

5.9 Methodology for Construction Integrated Recording (CIR)

5.9.1 Construction Integrated Recording shall be undertaken by the *Archaeological Contractor* to the general requirements as described in the GWSI: HERDS.

5.9.2 Within the CIR area (C31039), the *Principal Contractor* will strip the overburden using a 360-degree excavator and toothless ditching bucket under the archaeological supervision of the *Archaeological Contractor*. C31039 indicates the area of likely impacts associated with compound area, however, should the area of stripping increase or change, this area may be amended to reflect the construction impacts (through agreement with the *Contractor*).

5.9.3 The *Principal Contractor* will limit their tracking of vehicles and plant within areas specified in the LS-WSI and/or as instructed by the *Employer*. The *Principal Contractor* will facilitate mapping and sampling of deposits by the *Archaeological Contractor* through use of agreed plant, a site share agreement and careful liaison between the *Principal Contractor* and their supply chain.

5.9.4 The works to be carried out by the *Archaeological Contractor* shall consist of:

- Archaeological monitoring ('observation') following the progress of topsoil stripping for the MWC construction compound by the *Archaeological Contractor*. Allowance must be made by the *Principal Contractor* for investigation of archaeological remains (especially associated with the Roman enclosure) and remains of quaternary geological importance, if identified.
- Investigation of archaeology and remains of quaternary geological importance undertaken by the *Archaeological Contractor*.

5.9.5 The *Archaeological Contractor*'s team shall consist of appropriately experienced archaeologists commensurate with the scale and nature of the *Principal Contractor's* works. The team shall undertake the observation and any required investigation such as they may reasonably be able to undertake and shall be commensurate with the scale and programme of the *Principal Contractor's* works. The *Archaeological Contractor*'s teams shall be advised where necessary by specialists, as appropriate and as agreed with the *Contractor*.

5.9.6 The *Archaeological Contractor* shall record the following observations on a daily basis. The record shall consist of, as a minimum:

- The site/trench codes as defined in the *Employer's* AIMS;
- the chainage/location of the area observed;
- the date(s) of the observation;
- personnel employed on site;
- a description of the construction works observed;
- the works (sub) contractor and personnel undertaking and supervising the construction activity;
- depths and extents of excavation works observed;
- measure of confidence that any archaeological remains would have been observed and reasons;
- the areas and horizons (both those containing archaeological or remains of quaternary geological importance and those which do not) unaffected by construction activity (with special reference to archaeological sites identified for preservation in situ);
- the reasons why any particular area of the works was not observed, and noting those areas not subject to disturbance from construction;

- location and description of any archaeological remains; and
- location and description of any modern remains.

5.9.7 An appropriate sample, as specified in Table 4 below, shall be excavated from cut features and other archaeological remains of importance. Sampling of cut features shall include feature inter-sections to establish relative chronologies. Spoil tips will be surface inspected for artefacts and metal detected. The extent of sampling shall be determined by the *Archaeological Contractor* in liaison with the *Employer*, through the Project Plan, but may, for instance, include the sample excavation of a selected number of deposits (both layers and negative, cut features), recording of structural remains, drawn sections and profiles, and/or be aimed at recovering sufficient information to determine function, form, and date. Any specific variations from this specification shall be indicated in the LS-WSI.

Table 4 – Sample of Archaeological Features to be Excavated

Type	Description	% to be excavated
Linear features (main body)	Agricultural	10%
Linear features (main body)	Non-structural settlement, industrial, funerary	10%
Linear features (main body)	Structural settlement, industrial, funerary	100%
Linear features (bends, termini)	All types	100%
Linear features	large "enclosure" ditch	10% to full depth
Discrete features	Pits/postholes - undated	50%
Discrete features	Pits/postholes - IA/RB	100%
Discrete features	Large Pits	50%
Discrete features	Large Pits IA/RB	100%

Deep features	wells/water pits	50%
Post-fast structures	Fences/buildings	100%
Stone, masonry structures	walls/buildings	50%
Stone, masonry structures	surfaces	25%
Other structures	ovens/kilns/hearths	100%
Funerary	Human, animal	100%
Layers	Agricultural, settlement	Under discrete judgement of the Supervisor
Discrete special deposits	Settlement, industrial, funerary (e.g. middens, industrial waste, pyre deposits	100%
Intersections	All types of feature/deposit	Typically 50% of each intersection

5.9.8 Every effort shall be made to establish the presence or absence of archaeological deposits by establishing the absolute ordnance datum (AOD) for the height of significant deposits, including the depth of modern intrusions, key stratigraphic components and natural deposits.

5.9.9 During monitoring, excavation will be undertaken using a mechanical excavator with toothless ditching bucket, except where the nature of the ground is such that an alternative bucket or means of breaking out prior to excavation is required (and the Employer has agreed an alternative method) – although bearing in mind the Site is within agricultural land, this alternative is unlikely to be required in this instance. It is the responsibility of the Archaeological Contractor to ensure that the finished surface is machined to a suitably 'clean' state in order to identify, define and investigate any exposed archaeological deposits. If the surface is not sufficiently clean, hand cleaning of the surface will be required (see Surface Cleaning, above).

5.10 Fieldwork Recording

5.10.1 Recording a sufficient sample of the archaeological features and deposits revealed must be sampled/or fully excavated to allow the resolution of the aims and objectives of the work. Structures, features, or finds which might reasonably be considered to merit preservation in-situ shall not be unduly damaged.

5.10.2 Recording is to include, as a minimum:

- The written record of individual context descriptions on appropriate pro-forma.
- Sections (1:10 or 1:20 scale) of cut features and significant deposits.
- Plans at appropriate scales (1:10, 1:20 or 1:50).
- Other drawn and written records on appropriate pro-forma.
- Single context planning should be used only if appropriate (i.e. where there is a complex sequence); and
- Digital photographs.
- A 'site location plan', indicating site north shall be prepared at 1:1250. A plan at 1:200 (or 1:100) shall be prepared showing the location of archaeology investigated in relation to the investigation area. The location of site plans will be identified using OSGB co-ordinates.

5.10.3 Section drawings shall be located on the relevant plan and OSGB co-ordinates recorded. The locations of PGM bench markers and any site Temporary Benchmark (TBM) shall also be indicated.

5.10.4 A record of the full extent in plan of all archaeological deposits as revealed in the investigation shall be made. These plans will be based on digital survey data (digital planning methods shall be agreed in advance with Employer), supplemented where appropriate by hand drawn records on polyester based drawing film (at a scale of 1:10 or 1:20 unless otherwise agreed with Employer.). All hand drawn information shall be digitised (or preferably generated digitally in the first instance), and final deliverables will be supplied in an Esri format and adhere to standards set out in the Cultural Heritage GIS Standard (HS2-HS2-GI-SPE-000-000004). Single context planning shall be used where complex stratigraphy is encountered.

5.10.5 A 'Harris matrix' stratification diagram shall be employed to record stratigraphic relationships (Harris et al. 1993) where appropriate. This record shall be compiled and fully checked by the Contractor during the course of the excavations. Spot dating shall be incorporated onto this diagram during the course of excavations.

5.10.6 The photographic record will be in digital format, captured by cameras with a minimum sensor size of 10 megapixel, resulting in high resolution TIFF (uncompressed) images. Photographs will illustrate both the detail and context of the principal archaeological features discovered. In addition, the Contractor shall take appropriate record photographs to illustrate work in progress. All photographic records will include information detailing: site name and number/code, date, context, scale and orientation.

5.11 Provision for unexpected remains

5.11.1 As outlined in the Project Plan for Mitigation, a number of heritage assets within and in close proximity to the Site indicate the character of the archaeological remains that many be expected to be found.

5.11.2 The most likely types of remains to be encountered are features and deposits associated with Iron age and Romano-British rural settlement. The following classes of remain might be considered 'unexpected':

- Human remains;
- 'Treasure' (see below).

5.11.3 Discovery of all such categories of feature shall be reported to the Employer and DJV so that an appropriate strategy to evaluate and characterise them can be agreed.

5.11.4 For human remains, the provisions outlined in in Burial Grounds, Human Remains and Monuments Procedures (HS2-HS2-EV-PRO-0000-000008) and CIfA 2017 updated Guidelines to the Standards for Recording Human Remains will be followed. Should pre-19th century human remains be encountered the Archaeological Contractor should inform the Employer or the Employer's Project Manager immediately so that these procedures can be implemented. Visible grave goods would be recorded and lifted before the end of the working day. Where this is not achievable the Archaeological Contractor will liaise with the Employer or the Employer's Project Manager to ensure that adequate security is provided at the Site.

5.12 Treasure

5.12.1 In the event of the discovery of 'treasure' as defined below, the Treasure Act 1996 will apply to works for Phase One of HS2 and the Archaeological Contractor shall comply with it. The Treasure Act defines 'Treasure' as:

- Any object at least 300 years old when found which is not a coin but has metallic content of which at least 10 per cent by weight is precious metal;
- When found, is one of at least two coins in the same find which are at least 300 years old at that time and have that percentage of precious metal; or
- When found, is one of at least ten coins in the same find which are at least 300 years old at that time.
- Any object at least 200 years old designated as treasure by the Secretary of State under section 2(1) of the Treasure Act 1996.
- Any object that would have been 'Treasure Trove'.

- Any object found with any of the above.

5.12.2 The Treasure (Designation) Order 2002 extends the definition of treasure to include:

- Finds of least two base metal objects (other than coins) of prehistoric date; and
- Any object (other than a coin) of prehistoric date with any precious metal content.

5.12.3 All finds falling within the definitions of treasure shall be reported immediately to the Contractor's Historic Environment Manager who will inform the Employer. All subsequent works must be undertaken in accordance with the relevant legislative requirements of the Treasure Act and all necessary measures taken to comply with those requirements and any project specific requirements will be implemented.

5.12.4 To protect the finds from theft, the Archaeological Contractor shall record the finds and remove them to a safe place. Where recording and removal is not feasible or appropriate on the day of discovery, the Archaeological Contractor shall ensure, on liaison with the Contractor's Historic Environment Manager that adequate site security is provided by the Contractor.

5.12.5 Subject to the Provisions of the Treasure Act 1996, all material that is defined as Treasure is vested in the franchisee or, if none, the Crown.

5.13 Environmental Sampling

5.13.1 The draft Environmental Sampling Strategy is provided at Appendix 3 of this document. This shall be revised following completion of the topsoil strip in each area, and reviewed at an interim stage during the hand excavation of features. Off-site sample processing will be conducted at Headland's in-house sampling facilities.

5.14 Metallic Objects and Residues

5.14.1 Where works are intended to address Specific Objectives relating to industrial activity and there is evidence for industrial activity, macroscopic technological residues (or a sample of them) shall be collected by hand. Separate samples (c. 10ml) shall be collected for micro-slags (hammer-scale and spherical droplets). Reference should be made to guidance on Archaeometallurgy (HE 2015b). Assessment of any technological residues shall be undertaken. Assessment of finds assemblages shall, where appropriate to the Specific Objectives being addressed, include x-radiography of all iron objects (after initial screening to exclude obviously recent debris) and, where appropriate, nonferrous artefacts (including all coins). Where necessary, active stabilisation / consolidation shall be carried out to ensure long-term survival of the material, but with due consideration to possible future investigations.

5.15 Preservation of Archaeological Remains *in situ*

5.15.1 Where preservation has been identified as an option for areas of the Site, or it becomes clear during the evaluation that certain parts of the Site might be retained *in situ* within the scheme design, the *Archaeological Contractor* will ensure that suitable samples are taken to assess the state of preservation (as set out in Historic England guidance on preserving archaeological remains) (HE 2016). Where it is proposed that waterlogged deposits are preserved, discussion should be held with the *Contractor* about initiating a water environment study. If preservation is considered to be a viable and desirable option, the areas proposed should be excluded from further plant/vehicle movement, to minimise the possible effects of compression and loading on the physical integrity of the Site. Thought should also be given to whether the proposed construction works will have any short or long term hydrogeological or chemical impacts on the archaeological remains.

5.16 Backfilling

5.16.1 The general requirements for backfilling are set out in paragraphs 5.3.64-5.3.67 of the Project Plan. Backfilling will comply with the Employer's Technical Standard - Route wide soil resources plan (Document No. HS2-HS2-EV-STD-000-000008). For the purposes of the archaeological evaluation simple backfilling will be appropriate.

5.16.2 The excavation areas shall not be backfilled and reinstated without the prior approval of the *Contractor's Historic Environment Manager*, although in exceptional circumstances some backfilling would be permitted if health and safety or ground stability reasons warranted.

5.16.3 Prior to backfilling the areas shall be pumped dry if necessary (by the *Archaeological Contractor*) and any necessary protection measures for archaeological remains (in addition to those for below ground infrastructure, services or utilities) shall be completed prior to backfilling. Any pumping will be carried out under a permit to pump issued by Fusion. Generally, all backfill material shall consist of non-toxic, uncontaminated, non-putrescible, natural and inert material which shall be compacted and (if necessary) tested (dynamic compaction test or other) in accordance with a specification provided by the *Contractor*. Surface conditions shall be reinstated to the required standard.

5.16.4 The areas shall only be backfilled by machine under appropriate conditions and with direct archaeological supervision. Arisings will be replaced strictly in the correct sequence, with the plough soil being replaced last. The arisings will be levelled with the blade of the excavator bucket or bulldozer and tracked over but will not be compacted.

5.16.5 Where excavation has been undertaken into the subsoil and/or alluvium to investigate a feature or recover artefacts, earth should be backfilled and firmly compacted prior to replacement of subsoil and topsoil layers (uncompacted).

5.16.6 Land drains or drainage where encountered should not be disturbed. Accidental damage to land/mole drains shall be immediately notified to the *Contractor*. The *Archaeological Contractor* will repair any damage to the satisfaction of the landowner or his agent. If a specialist contractor is required to meet this requirement the *Contractor* will be informed immediately.

6 Post-investigation Reporting and Archiving

6.1 Interim Report

6.1.1 The *Archaeological Contractor* shall submit separate Interim Reports for the Construction Integrated Recording, and the Archaeological Recording, within two weeks of the completion of each respective phase of works. As a minimum this shall include:

- A summary of the work undertaken and the results;
- A background to the work;
- The Aims and Objectives the work intended to address;
- A description of the results of the work;
- Outline of contribution to the specific HERDS Objectives;
- A context table (including finds discovered and spot dates where applicable);
- A location plan of the works;
- A post-excavation plan of the works; and
- Photographs of significant and/or typical features and artefacts.

6.2 Fieldwork

6.2.1 The P01 fieldwork report will be produced within 6 weeks of completion of fieldwork, compliant with the guidance for post-excavation assessment reports (HS2-HS2-EV-GDE-000-000027) and the following structure:

- Executive Summary;
- Introduction;
- Summary of Project's Background;
- Assumptions and limitations;

- Description and illustration of the Site location;
- Summary of Previous Works relevant to the archaeology of the Site (e.g. documentary evidence, previous surveys, precious evaluations and excavations etc);
- Geology and topography of the Site;
- The Specific HERDS Objectives and Specific Aims of the work;
- Scope and methodology (including dates the fieldwork was undertaken);
- Results and observations, to include:
  - Stratigraphic report,
  - Summary of specialist finds reports,
  - Summary of environmental evidence report,
  - Interpretation of results against original expectations, Aims and Specific HERDS Objectives,
  - Review of evaluation strategy (where appropriate).
- Discussion, to relate back to the Specific HERDS Objectives and Site-specific Aims – to include an assessment of such aspects as:
  - Changing use of the settlement over time within its landscape;
  - The origin of settlement at the Site, its morphology and development;
  - Disuse and abandonment of the settlement;
  - evidence of industry, craft production, agriculture etc. – synthesising the specialist reports on the artefacts and faunal/floral assemblages.
- Publication and dissemination proposals, including archive deposition;
- References to all primary and secondary sources consulted;
- Updated project design for analysis, publication and dissemination to include a scope, resource plan and programme;
- Appendices: to include illustrations, contextual summary by area, phase plans of the site, full specialist finds reports, environmental reports, site matrices (where appropriate) and full definitions of the interpretation terms used in the report; and
- OASIS / HER Form.

6.2.2 The Fieldwork Report will contain figures accompanied by supporting text. All figures within the report shall be on the same paper size, where appropriate. All categories of anomaly identified will be labelled with the appropriate assigned number code on the figures, which will be referred to in the text document.

6.2.3 The following figures will be included in trial trenching reports:

- General plan (mandatory)
- Engineering design (mandatory)
- Site location
- Survey extent and trial trench locations
- Survey results to include plans and sections of archaeological features, deposits and sequences
- Selected photographs of representative and/or significant features and finds

6.2.4 With regard to Digital Archival Material including OASIS/Historic Environment Record summary sheets, the *Archaeological Contractor* will provide the required data, metadata and digital material as specified in the Historic Environment Digital Data Management and Archiving Procedure (Document No. C262-ARP-EVSPE-000-000003).

6.3 Survey Report

6.3.1 A survey report will be produced. This will include a written and graphic survey report for the works upon completion of fieldwork as an appendix to the Fieldwork report. Evidence shall be provided for checking measurements and results of levelling for establishment of TBMs. Unless otherwise agreed, the survey report shall be submitted to the *Contractor* and *Employer* within two weeks of completion of fieldwork.

6.3.2 The *Archaeological Contractor* shall prepare and submit site area outlines and levels in accordance with the *Employer's Cultural Heritage GIS Standard* (Document No. HS2-HS2-GI-STD-000-000010) and BIM requirements (Document No. 1EW03-FUD-IM-PLN-C000-000001). Each drawing shall identify the relevant event code and subsite division, if applicable.

6.4 Archaeological Summary Report

6.4.1 A short summary report of no more than 500 words (the Summary Report) for the works shall be prepared for submission to the *Contractor* for subsequent publication within an appropriate journal or publication outlet specified by the *Employer*.

6.4.2 The draft summary report shall be submitted to the *Contractor* for approval within 8 weeks of the completion date of the fieldwork event. The *Contractor* will review the draft summary report

and then issue it to the *Employer* for comment and approval. The *Archaeological Contractor* shall allow two weeks in the programme of works for *Contractor* and *Employer* to provide comments.

6.4.3 The *Archaeological Contractor* shall include any amendments required by the *Contractor* and *Employer* in the final Summary Report which shall be submitted within one week of receiving comments on the draft report.

6.5 GIS Deliverables

6.5.1 GIS Deliverables will be provided to the *Contractor* for approval within 8 weeks of the completion date of the fieldwork. The specific requirements of this deliverable are provided by HS2 in the Technical Standard Specification for historic environment investigations (Document No. HS2-HS2-EV-STD-000-000035) and the GWSI: HERDS (Document No. HS2-HS2-EV-STR-000-000015).

7 Delivery Interfaces

7.1.1 The following interfaces are anticipated on the basis of current information:

- The Employer (HS2);
- The Contractor (Fusion);
- The Greatworth Area Principal Contractor EKFB via Fusion
- Third party stakeholders via Fusion;
- HS2 via Fusion;
- Other contractors working on separate parts of the Mitigation Areas.

8 Health, Safety and Environment

8.1.1 The Archaeological Contractor will undertake the works in accordance with the Employer's route wide health and safety requirements (Safe at Heart) and, if applicable, the Contractor's health and safety requirements for specific locations.

8.1.2 The Archaeological Contractor will be solely responsible for Health and Safety during the mitigation, and a Risk Assessment and Method Statement (RAMS) for the mitigation has been produced (see Appendix B). All work will also be undertaken in accordance with the Archaeological Contractor's Health and Safety Policy.

8.1.3 All site staff will be fully inducted and will read and sign the RAMS before commencing work on mitigation areas.

8.2 Site access and construction traffic

8.2.1 Vehicle movement will involve:

- Deliveries to site – a limited number of movements at the beginning and close of site works plus a weekly movement of materials taken off-site for processing;
- Parking – Daily vehicle movements to and from site of personnel at the beginning and close of each day;
- Plant movements – ongoing movement around the site.

8.3 Ecology

8.3.1 Archaeological excavation areas will be adjusted to allow for ecological constraints as identified in the Site Ecological Pack and in line with its requirements.

8.3.2 If during the course of the works the Archaeological Contractor becomes aware of evidence for protected species such as, inter alia, reptiles or Great Crested Newts are revealed, works shall be suspended in that location and area fenced to clearly demarcate the ecological constraint. The Archaeological Contractor will immediately inform the Contractor, who will notify the Employer.

8.3.3 The Contractor will assess the requirements for ecological mitigation and advise the Archaeological Contractor on the appropriate measures to changes to their working method that should be adopted. All archaeological works will be undertaken in accordance with the Contractor's Urgent Works Package 1 Environmental Management Plan.

8.3.4 The scheme design will take account of the identified constraints and implement suitable off-sets and 30m exclusion zones dependent on the constraint.

8.3.5 If clear gaps within hedgerows are required for access, then a Permit to Clear will be obtained from LM and an ecologist will be present during any clearance.

8.3.6 Appropriate measures will also need to be implemented to ensure safety and to meet environmental requirements in relation to watercourses.

8.4 Plant Noise

8.4.1 It is anticipated that plant noise will be minimal, and the main parts of the mitigation areas site lie some distance from any residential area. It is not anticipated that a mechanical breaker will be used during the course of the archaeological fieldwork.

8.4.2 The Archaeological Contractor will ensure that all staff working in the vicinity of plant are provided with ear defenders.

8.5 Utilities

8.5.1 Comprehensive safe digging procedures will be observed, including underground utility scans prior to breaking ground and a permit to dig system observed.

8.5.2 The RAMS outlines the emergency procedures that will be followed by the Archaeological Contractor (Appendix B).

8.6 Temporary Works

8.6.1 The Contractor will assess the requirement for temporary works and will be responsible for their design, installation and maintenance.

8.6.2 Temporary works will be co-ordinated by the Contractor's Temporary Works Co-ordinator (TWC) who will be responsible for ensuring that the planning, erection, use, maintenance and dismantling of temporary works is undertaken in line with the Contractor's temporary works process and as agreed with the relevant Temporary Works Manager (TWM). A temporary works schedule produced at tender stage will be reviewed and updated at regular intervals.

8.6.3 All temporary works will be designed and installed in accordance with the Employer's Technical Standard for Temporary Works (Document No. HS2-HS2-CV-STD-000-000005), the Contractor's IMS and Construction Phase Health and Safety Plan.

8.6.4 A temporary works register will be maintained. Temporary works will be designed by competent designers and inspected on a regular basis by a competent person. Temporary works are expected to comprise:

- Mitigation Area perimeter fencing;
- Occasional localised stepping/battering of large archaeological features to ensure stability of excavation sides;
- Stockpile bunds.

8.7 Site safety and security

8.7.1 Following site set-up, the archaeological mitigation will be conducted in accordance with the information provided in the relevant Project Plan and this LSWSI and the safe methods of work described in the Archaeological Contractor's Risk Assessment and Method Statement.

8.7.2 The RAMS outlines the procedures to be followed if members of the public enter the mitigation areas, which include standing down plant until any unauthorised people have left (Appendix B).

8.8 Local community, general public, neighbouring properties and businesses

8.8.1 It is not anticipated that the archaeological works will cause significant disruption to the local community or neighbouring properties and business, as most of the works will be on land that lies some distance from residential areas and public footpaths.

8.8.2 Given the distances to residential areas, it is not anticipated that plant noise will be problematic for the local community.

8.8.3 All plant movements will be undertaken with a mind to minimising disruption to local traffic and infrastructure.

8.8.4 Health and Safety procedures will be in place to minimise the risk to any member of the public who enters the mitigation areas (see the RAMS, Appendix B).

9 Information Management

9.1.1 GIS deliverables will be provided in accordance with the *Employer's* Cultural Heritage GIS Specification (Document No. HS2-HS2-GI-SPE-000-000004). CAD files will be GIS compatible and follow standards set out in the same Specification. Figures may be produced using CAD, but final deliverables must be supplied in GIS format.

9.1.2 Mapping and spatial data deliverables will conform to the *Employer's* GIS Standards as set out in Document No. HS2-HS2-GI-STD-000-000002 and other associated referenced documents.

9.1.3 The *Employer's* standard template for reports (Document No. HS2-HS2-PM-TEM-000-000004) will be used.

10 Quality Assurance Process

10.1.1 All archaeological works will be delivered in accordance with the *Contractor's* AWH Quality Plan (Document No. 1EW03-FUS-QY-PLN-C000-001658). The trial trenching report will be prepared and conducted by suitably qualified, experienced and competent professionals.

10.1.2 The trial trenching report will be checked and then reviewed by senior, qualified, experienced and competent professionals prior to issue to the *Employer* for acceptance. Final reports, following comments, will be checked and reviewed again prior to issue.

11 Change Control

11.1.1 During the course of the archaeological investigation unexpected, complex or undated archaeological remains may be encountered. In order to inform the decision-making process

and to minimise delays to the enabling works construction programme it may be necessary to implement a contingency or vary the methodology or extent of the archaeological investigation.

11.1.2 The GWSI: HERDS establishes the need to manage unexpected discoveries and regularly review ongoing fieldwork events (Sections 7.6.5 and 7.6.17; Document No. HS2-HS2-EV-STR-000-000015). In order to promote rapid decision making and to minimise delays a clearly defined change control process will be followed. This change control process will enable:

- Rapid decision making during historic environment investigation;
- The implementation of contingencies;
- The variation of methodologies being used on site;
- The localised extension of investigation areas; and
- The rapid implementation of mitigation measures.

9.1.3 The change control process will be recorded using the proforma *Historic Environment Fieldwork Change Control Acceptance Sheet* at Appendix 2 of this LSWSI and will comprise the following steps:

1) The *Archaeological Contractor* will:
- prepare an interim summary of the investigation results noting key features or elements of the archaeological remains or structure;
- provide a proposal for the variation to the works or methodologies; and

- suggest any new or existing HERDS objectives to which the variation may provide opportunities for knowledge gain;

2) The interim summary will be submitted to the *Contractor's Historic Environment Manager* who will disseminate the results and arrange a meeting on site with the *Employer's Historic Environment Manager* and local authority (stakeholder) archaeologist;

3) At the site meeting all parties will:
- review the nature, extent and significance of the archaeological remains;
- review and agree the proposed variation to the works; and
- signify their endorsement or approval of the variation by signing the *Historic Environment Fieldwork Change Control Acceptance Form.*
- at the end of the site meeting the *Contractor's Historic Environment Manager* will instruct the *Archaeological Contractor* to implement the variation to the works.

4) Following the site meeting the *Contractor* will submit a copy of the completed the *Historic Environment Fieldwork Change Control Acceptance Form* to the *Employer* via eB.

5) Where the rapid implementation of mitigation measures is required the *Contractor* will, prior to completion of the ongoing archaeological investigation:
- prepare a new Project Plan detailing the aims, HERDS objectives and specification of the archaeological mitigation and submit it to the Employer for acceptance;
- Request a new site code from the *Employer*; and
- Update and resubmit the existing LSWSI to include the archaeological mitigation works.

12 Interface and Communication Plan

12.1.1 Due to the nature of the proposed works, it is considered that community engagement is not applicable for this trial trench evaluation. The results of the investigations will be disseminated to the wider public in due course, as appropriate.

13 Site Monitoring and Engagement Plan

13.1.1 Prior to commencing the works, the *Archaeological Contractor* shall agree a programme of weekly-written progress reports and periodic progress meetings with the *Contractor's* Historic Environment Manager and shall be represented at such meetings to the satisfaction of the *Contractor*. The *Archaeological Contractor* shall provide information describing progress on-site to date and feedback from any initial assessment.

13.1.2 Where required, the *Contractor's* Historic Environment Manager shall arrange site visits with specialist stakeholders and expert bodies to provide advice on-site where this is considered beneficial and agreed with the *Employer*. This will be undertaken within the *Employer's* communication protocols set out in the *Employer's* Community Relations Strategy.

13.1.3 Periodic updates on the progress of the Area Central Enabling Works archaeology programme shall be submitted to the *Employer* and Local Authority Archaeologist by the *Contractor's* Historic Environment Manager. The *Archaeology Contractor* shall provide information to the *Contractor's* Historic Environment Manager as requested to inform this reporting.

13.1.4 The *Contractor's* Historic Environment Manager shall arrange and convene monitoring site visits with the *Employer* to assess the quality and progress of the archaeological works and their adherence to HS2 technical standards and procedures.

13.1.5 The *Employer* may invite the Local Authority Archaeologist to attend these meetings, as appropriate. The *Employer* will be responsible for informing Historic England and the local authority historic environment specialists on the progress of fieldwork activities and findings.

13.1.6 In addition to monitoring visits, the *Employer* may plan and host media events or documentary recording, particularly in the event of a significant archaeological discovery. If requested to do so, the *Archaeological Contractor* shall provide the HS2 media team with escorted access to the Site. Any request for media access will be confirmed in advance, in writing, by the *Contractor's* Historic Environment Manager.

13.1.7 There shall be no unauthorised access to the works in any other circumstances. Any visits to the works shall be in accordance with the *Contractor's* health and safety, site access and security requirements.

14 Quality Assurance Processes and Plan

14.1.1 All archaeological works will be delivered in accordance with the *Contractor's* AWH Quality Plan (Document No. 1EW03-FUS-QY-PLN-C000-001658) and the standards and guidance set out in the following documents:

- High Speed Rail (London–West Midlands) Environmental Minimum Requirements.
- High Speed Rail (London–West Midlands) Environmental Minimum Requirements Annex 3: Heritage Memorandum (Document No. CS755 02/17).
- High Speed Rail (London–West Midlands) Environmental Minimum Requirements Annex 1: Code of Construction Practice (Document No. CS755 02/17).
- HS2 Generic Written Scheme of Investigation: Historic Environment Research and Delivery Strategy (Document No. HS2-HS2-EV-STR-000-000015).
- HS2 Technical Standard: Specification for Historic Environment Investigations. (Document No. HS2-HS2-EV-STD-000-000035).
- HS2 Technical Standard: Historic Environment Physical Archive Procedure (Document No. HS2-HS2-EV-STD-000-000039).
- HS2 Technical Standard: Historic Environment Digital Data Management and Archiving Procedure (Document No. HS2-HS2-EV-STD-000-000040).
- HS2 Cultural Heritage GIS Specification (Document No. HS2-HS2-GI-SPE-000-000004).
- Chartered Institute for Archaeologists (CIfA), 2014a. Code of Conduct.

- CIfA, 2014b. Standard and Guidance for Archaeological Field Evaluation.
- Historic England, 2015a. Management of Research Projects in the Historic Environment (and associated guides and project planning notes).

15 Resource Plan

15.1 Project Resourcing

15.1.1 The *Archaeological Contractor* shall provide project personnel of experience as described below. The personnel shall be approved by the *Contractor*. Approval may be withdrawn by the Employer at their discretion and in accordance with the contract conditions.

15.1.2 The *Archaeological Contractor* shall submit CVs of all proposed personnel including any specialists, but excluding site technician grades, to the *Contractor* for approval if this has not already been done as part of the pre-qualification process.

15.1.3 The works shall be managed, directed and staffed by appropriately qualified and experienced personnel. The *Archaeological Contractor's* Key Person shall possess at least ten years' relevant experience. Table 3 outlines the Connect personnel who will be involved in the evaluation.

Table 3 MHI Personnel

Name	**Position**
Mike Kimber	**Project Director**
Candy Hatherley	**Project Manager**
Beth Doyle	Lead Archaeologist
Robert Falvey	Supervisor
Bonne Knap	Supervisor
Chloe Hill, Dylan McGlynn, Kris Conlin, Ross Lyall-Jenkins, Domenico Molinari, Aaron Thompson	Archaeologist
Michael Wallace	Environmental Manager

15.1.4 The excavation, sampling and recording of the works shall be project managed by a Fieldwork Director who is a Member of the Chartered Institute for Archaeologists (MCIfA). Supervisory

staff shall have an appropriate level of demonstrable experience commensurate with their specific role i.e. an appropriate level of membership of the CIFA, IHBC or an equivalent demonstrable professional standing.

15.1.5 The *Archaeological Contractor's* project team shall include an environmental archaeologist suitably qualified in archaeological science and geo-archaeological sediment description methods, and on-site sample processing and assessment techniques.

15.1.6 The *Archaeological Contractor's* project team shall be staffed by technician grades with minimum six months' experience in appropriate aspects of excavation and recording.

15.1.7 Specialist staff employed on any aspect of the works, including post-excavation assessment or analysis of any kind including the writing of reports, shall be suitably qualified and shall be supervised by personnel with a minimum of ten years of relevant experience in their field (this may be inclusive of post-graduate studies).

15.1.8 Specialist staff shall be available, at 24 hours' notice, for the duration of the works to provide advice on any specialist tasks to be undertaken.

15.2 Site Specific Requirements

15.2.1 To deliver the works the *Archaeological Contractor* shall provide:

- An Archaeological Risk Assessment and Method Statement inclusive of safe methods of working;
- Suitably qualified and competent staff who have valid CSCS cards;
- Suitably qualified and competent plant operators who have valid CSCS cards and certification;
- A team of suitably qualified archaeologists, experienced in archaeological investigation, recording and the nature of archaeological deposits which are expected on this site;
- Mechanical excavator(s) of a suitable type and size to cleanly undertake the topsoil strip;
- Appropriate welfare and first aid facilities for the number of staff deployed to the Site;
- All fencing, signage, goal posts and security measures required to fulfil the aims and objectives set out in the Project Plan and this LSWSI; and
- Any other tools or materials the *Archaeological Contractor* required to successfully deliver the programme of archaeological trial trench evaluation defined in the relevant Project Plan and this LSWSI.

16 References

Title	Reference
British Geological Survey, Geology of Britain viewer http://mapapps.bgs.ac.uk/geologyofbritain/home.html	BGS Online 2019
Campbell, G. Moffett, L. and Straker, V. 2011 Environmental Archaeology: A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post-excavation (2nd ed.). Historic England Guidance	Campbell et al. 2011
Chartered Institute for Archaeologists (CIfA), 2014a. Code of Conduct.	CIfA 2014a
Chartered Institute for Archaeologists (CIfA) 2014b Standard and Guidance for Archaeological Field Evaluation	CIfA 2014b
Chartered Institute for Archaeologists (CIfA) 2014c Standard and Guidance for Archaeological Excavation	CIfA 2014c
Chartered Institute for Archaeologists (CIfA) 2014d Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives	CIfA 2014d

Cranfield Soil and Agrifood Institute, Soilscapes http://www.landis.org.uk/soilscapes/index.cfm	Soilscapes 2019
Fusion AWH Quality Plan	1EW03-FUV-QY-PLN-C000-001658
Fusion BIM Execution Plan	1EW03-FUS-IM-PLN-C000-000001
Fusion Construction Phase Health and Safety Plan	1EW03-FUV-HS-PLN-C000-000053
Fusion Incident & Emergency Preparedness Plan	1EW03-FUV-HS-PLN-C000-000001
Fusion Standard for Accident and Incident Investigation and Reporting	SH2 STD1
Harris, E C 1989 Principles of Archaeological Stratigraphy (2nd ed.) Academic Press	Harris 1989
High Speed Rail (London-West Midlands) Environmental Minimum Requirements Annex 3: Heritage Memorandum	CS755 02/17
High Speed Rail (London-West Midlands) Environmental Minimum Requirements Annex 1: Code of Construction Practice	CS755 02/17
Historic England 2011 Environmental Archaeology: A Guide to the Theory and Practice of Methods, from Sampling and recovery to Post-excavation (2nd ed.).	HE 2011
Historic England 2015 Geoarchaeology: Using earth sciences to understand the archaeological record.	HE 2015
Historic England 2016 Preserving Archaeological Remains: Decision-taking for Sites under Development.	HE 2016
Historic England 2015 Archaeometallurgy: guidance for best practice	Historic England 2015b
HS2 Phase One Environmental Statement and Supplementary Environmental Statements	ES 3.5.2.7.4 ES 3.5.2.7.5 ES 3.5.2.7.6 CH-001-007 CH-002-015 - ES 3.5.2.7.4 CH003-015 CH004-015

HS2 Ltd, 2015. Heritage Risk Model Phase 1 Review 2014 - Volume I	C253-ATK-EV-REP-000-000002
HS2 Technical Standard: Cultural Heritage GIS Specification	HS2-HS2-GI-SPE-000-000004
HS2 Technical Standard: – Temporary Works	HS2-HS2-CV-STD-000-000005
HS2 Technical Standard: - Route wide soil resources plan	HS2-HS2-EV-STD-000-000008
HS2 Technical Standard: Generic Written Scheme of Investigation: Historic Environment Research and Delivery Strategy	HS2-HS2-EV-STR-000-000015
HS2 Technical Standard: Specification for historic environment investigations	HS2-HS2-EV-STD-000-000035
HS2 Technical Standard: Specification for Project Plans and Location Specific Written Scheme of Investigations	HS2-HS2-EV-STD-000-000036
HS2 Technical Standard: Historic Environment Physical Archive Procedure	HS2-HS2-EV-STD-000-000039
HS2 Technical Standard: Historic Environment Digital Data Management and Archiving Procedure	HS2-HS2-EV-STD-000-000040
HS2 Enabling Works Information WI0200 General Constraints	1E001-HS2-PR-ITT-000-000098
HS2 Detailed Desk Based Assessment at Lower Thorpe, Northamptonshire	1D037-EDP-EV-REP-C000-000026
HS2 Detailed Desk Assessment of Edgcote Battlefield	1D037-EDP-EV-REP-000024
HS2 Geophysical Survey Report – Rural South – Northamptonshire 2014-2015	C252-ETM-EV-REP-020-000152_P03

17 Glossary of Terms

17.1.1 Content The following terms have been used in this report:

- **Archaeological Contractor** – the organisation undertaking the specific historic environment works for the Contractor.
- **Contractor** – the organisation undertaking the Enabling Works on behalf of the Employer.
- **Detailed Desk Based Assessment (DDBA)** – analytical document that builds on the information gathered previously in the Environmental Statement to address particular issues, questions or uncertainties within a given area. It may be developed to provide a more detailed understanding of the resource in an area to inform design development or construction programming.
- **Employer –** HS2 Ltd, the organisation responsible for delivery of HS2 Phase One Scheme and all terms and conditions, policies, procedures, and payments
- **Generic Written Scheme of Investigation: Historic Environment Research and Delivery Strategy (GWSI: HERDS)** – the framework for delivering all historic

environment investigations undertaken as part of the HS2 Phase 1 programme.

- **Location** – a specific HS2 worksite or group of worksites that are being addressed as a combine historic environment investigation programme of assessment, evaluation and investigation.
- **Project Plans** – specification document for each specific package of activity (e.g. a survey, desk-based assessment, excavation, recoding project). The plans would respond to the Specific Objectives set out in the GWSI: HERDS and be delivered within an agreed budget.
- **Works** – the specific historic environment assessment, evaluation or investigation works at each location.

18 Appendices

18.1 Appendix 1 - Project Plan

Table 4 Project Plan

Document Number	Project Plan	Status
1EW03-FUS-EV-REP-CS07_CL25-002576	AWHf Project Plan for Archaeological Recording at Thorpe Mandeville Northamptonshire AC310	Code 1

18.2 Appendix 2 - Change Control Register

Historic Environment Fieldwork Change Control Acceptance Sheet	
Site Code:	
Site Name:	
Historic Environment Investigation Type:	
Contractor:	
Project Plan Doc. No.:	
LSWSI Doc. No.:	
Summary of Results	
Fieldwork Director:	Date:
Description of Proposed Change:	

Drawing / Sketch:

Change type: (Delete as applicable)	Implementation of Contingency	Variation of Methodology	Rapid Investigation	Extension of Investigation Area

Proposed HERDS Objectives:

Compiled by: (Archaeological Contractor)	Name	Date	Signature
Checked by: (Contractor)	Name	Date	Signature
Consultation with: (Stakeholder Archaeologist)	Name	Date	Signature
Approved by: (HS2 Historic Environment)	Name	Date	Signature

18.3 Appendix 3 – Environmental Sampling

Sampling strategy template

Why take bulk samples? Bulk samples provide information on a range of environmental proxies and the deposits in which they are found. Typically these samples are taken for preserved seeds and charcoal but can also include; small mammal bones and fragments of larger bones; fish and bird bones; molluscs; hammerscale and other evidence of industrial processes; small finds. Evidence from bulk samples can indicate where particular domestic or industrial processes were taking place, or highlight locations where disposal of different materials occurred.

What sort of sampling should I be doing? At the evaluation stage, collection, processing and assessment of bulk samples helps to characterise the site. One key bit of information that comes from the samples relates to the archaeological preservation conditions, which need to be understood in order to define a strategy at the excavation phase.

The analysis of samples from the evaluation and subsequent archaeological recording (excavation) phase provides many of the key details about what was happening on a given side, including types of food eaten, the local environment and how spaces were used and managed over time.

What is a sampling strategy? The strategy is the thing that sets out the why, where, what, how and when in relation to sampling. Sampling should be targeted and focused. It should be based on sound understanding of the nature of comparable archaeological remains both locally and regionally. It also needs to be flexible; allowing for an iterative approach as new information may be brought to bear as the project develops. In the strictest sense every context could be sampled for a range of environmental proxies. However, by developing a strategy that focuses on the likely remains to be preserved, and the ability of this material to provide pertinent archaeological information, this allows for targeted, site specific, and relevant samples to be taken. The strategy thus sets out a framework to guide the taking of samples.

- Why – samples should be taken to address a specific question, for example help address a HERDS objective, to recover dating evidence or to understand an aspect of the site and how it might have changed over time.
- What – what features are you actually going to sample to address those questions? On what types of deposits will the sampling focus? Will other types of sample be required, such as specialist samples, for example horizontally gridded areas sampled for hammerscale distribution, or vertical monolith tins for pollen? [1]
- Where – some locations on site may be better suited to addressing specific questions than others. The strategy is likely to vary across an area or with

[1] * Most bulk samples should be 40-60ltrs (or the maximum recoverable if the feature has a smaller volume) and should all be fully processed within 2 weeks of being taken. This allows results to inform future planning for additional fieldwork (at the evaluation stage) or feedback to site to guide further potential samples (in an excavation). There may be situations where smaller samples are appropriate, for example if the deposits are waterlogged and particularly rich. Advice from internal specialists should always be sought in these situations and any changes recorded within this template.

regard to different feature types. Importantly a sampling strategy also highlights where unproductive deposits might be present and focuses resources away from these features.

- How – deposits such as a basal fill of a ditch might require a larger area of the ditch to be exposed so that sufficient material for the sample can be recovered. When sampling a larger context, a scatter approach should be used to ensure any variability in the fill of the context is captured within the samples (this variability is a reason why it is good practice to process all of the sample taken, rather than to sub-sample at the processing stage).
- When – at what stage in the work will the samples be taken? In some instances a few early samples processed rapidly can help to refine the strategy later in the programme, particularly on large and complex sites. This iterative approach, if integrated with the fieldwork, further helps refine and focus project resources.

1. Key elements of sampling strategy from PP

An initial sampling strategy was produced for the project plan. Key parts should be summarised here.

1.1.1 The Site has the potential for features associated with prehistoric settlement and agricultural activity and to a lesser degree with medieval agricultural evidence, as identified in Section 3.2. Sampling will, therefore, target the following, where present, as a minimum:

- Archaeological features which are likely associated with prehistoric activity (i.e. ditches, gullies) as well as other relevant remains (i.e. pits or postholes). Particular attention will be paid to remains associated with settlement activity (including floor surfaces where they survive); and
- Deposits representing the main phases of activity on Site (to assess whether there are changes in rates of deposition or material survival over time). The principal phase of the Site is likely to be the Mid-Late Iron Age, however, evidence of Early Romano-British and/or medieval phases may be encountered.

1.1.2 Sampling will not only just target charcoal-rich or wet deposits, but will be undertaken on those features outlined above, taking into account advice from the *Contractor's* environmental archaeologist. This will ensure that samples are recovered from a representative range of contexts, which adequately characterise past activities on site and allow an assessment to be made of the extent to which they help address palaeoenvironmental and palaeo-economic questions.

1.1.3 Targeted sampling of sediment sequences within features may be undertaken for the recovery of 'undisturbed' samples for more detailed sediment description and potential lab assessment e.g. soil chemistry, magnetic susceptibility or soil micromorphology. Although detailed lab work is usually carried out as part of post excavation analysis, it may be deemed appropriate to carry out some preliminary

2. Contractors detailed sampling strategy for LSWSI on basis of project plan and knowledge of the site

Based on the initial sampling strategy and background information (including geophysical survey / trial trenching), what additional observations would you make based on past experience of this type of site; the local geology / topography; from other similar sites in the vicinity.

This section should be complied by the archaeological contractors project managers and specialist teams.

Sampling to retrieve palaeo-economic/environmental evidence ('ecofacts') will comply to HS2 Technical Standard Specification for Historic Environment Investigations (HS2-HS2-EV-STD-000-000035) and Historic England guidance (HE 2011, 2015).

The sampling strategy will be subject to revision in response to the nature of archaeological deposits encountered and the findings of palaeo-economic/environmental assessment conducted during mitigation. Sampling revisions will be undertaken by the environmental manager of Headland Archaeology (UK) Ltd in consultation with the project manager, Fusion, the Employer and stakeholders.

Site visits by the environmental manager or other appointed specialists will be undertaken at appropriate stages of the mitigation, decided in consultation with the project manager. During site visits toolbox talks will be used to communicate to site staff revisions to the sampling strategy and the site-specific objectives of palaeo-economic/environmental research.

A review of information from desk-based assessment, trial trenching results and regional evidence indicates that the incidence of charred plant remains is expected to be low, and the incidence of animal bones is expected to be very low. There is reasonable potential for the incidence of human remains including cremations, waterlogged remains, pre-Iron Age deposits, and significant features including burnt mounts. Specific sampling strategies for these kinds of deposits are outlined below, and these always take precedence over the generic strategy.

Paleo-economic/environmental evidence has the potential to address the GWSI: HERDS Specific Objectives for Knowledge Creation (KC) identified in the Project Plan. These include plant and animal resource use, and how patterns in use varied across the region, by type of site and through time. The potential to retrieve palaeo-environmental evidence that indicates the nature of past environments, and how they were impacted by human activity. To explore the role of plant and animal resources in the formation of cultural distinctiveness and identity.

Continued overleaf…

…Box 2 continued.

Collected 'bulk' samples will be 40 litres in volume, or 100% of the deposits if less than 40 litres (NB: separate sample size policies for specific deposits are described below). The remaining deposit material will be coarse sieved on site if there is reasonable potential for the recovery of small finds or animal bones. If a deposit is suspected to contain remains preserved by waterlogging, a separate 10 litre sub-sample will be collected and marked as waterlogged. This sub-sample will be reviewed by specialist staff before being wet-sieved. The 10 litre sub-sample takes precedence over the 'bulk' sample, and will always be retained if a deposit is suspected as waterlogged. Flotation and wet-sieving will use a minimum mesh size of 250 micros.

Sampling will target secure, stratified contexts. Contexts with clear artefactual data evidence will be prioritised. Other contexts will be sampled to ensure adequate spatial and temporal sample coverage is achieved, or to retrieve ecofacts suitable for radiocarbon dating.

All samples will be taken for a specific reason that is related to HERDs or other relevant research objectives. Reasons for sampling may relate to feature- or period-specific enquiries as detailed below. All samples will be accompanied by a free-text comment from the sampler as to their motives for sampling.

Elongated negative features, e.g. ditches and gullies. These features have the potential to provide information on site formation and, potentially, on palaeo-economy through the deliberate disposal of material or through the natural accumulation of nearby material. The basal fills of 100% of ditch terminus will be sampled, and basal fills from c.50% of mid-points of these features will also be collected. Well stratified primary and other relevant fills will also be sampled as appropriate. When sampling fills that exceed 40 litres, care will be taken to collect material from all parts of the fill (sides, centre, top and bottom). Care will be taken to identify waterlogged deposits. The collection of monolith or Kubiena when soil micromorphology work may provide useful information of site formation and/or pollen is potential preserved that can provide information on the surrounding environment.

Discrete negative features, e.g. pits and postholes. These features have the potential to provide information on palaeo-economy through the disposal (or storage) of ecofacts; it is recognised that in some circumstances disposed waster and/or incidental inclusions may represent the majority of palaeo-environmental evidence from a site. Additionally, structure remains may survive providing key information on architectural design and form. Except for pit alignments (see separate feature-specific sampling guidance below), c.25% to c.50% of these samples will have 'bulk' samples taken. Sampling rates will be increased if deposits appear to be ecofact-rich or contain structural remains.

Continued overleaf…

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…Box 2 continued.

Discrete positive features, e.g. in-situ burning and kilns. In-situ burning, or associated dumps of charred material, can provide important information paleo-economic activity, including fuel use and processing practices. C.100% of these features will be sampled, with quadrants (for spreads of burning) or sections (for kilns and ovens) sampled separately as appropriate.

Extended positive features, e.g. occupation surfaces and spreads. Largely undisturbed spreads associated with human activity can provide useful information of activities, site resources catchment and site formation. Except for surfaces associated with burnt mounds (see separate feature-specific sampling guidance below), c.50% to c.100% of features will be sampled, with an emphasis on undisturbed floor surfaces. Dependant on the scale of the spread, 'bulk' samples may be taken from quadrants or grids. Additionally, for well-preserved floor surfaces Kubiena samples may be taken for soil micromorphology to investigate formation and/or metal-free (plastic trowel) spot samples for geochemical/XRF samples to investigate spatial patterns in industrial activities.

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3. Pre-ex / post soil removal revision / additions to the sampling strategy

Even sites that seem to be well-characterised by geophysical survey / trial trenching often exhibit greater variation once the topsoil is removed. Based on an initial site visit by the archaeological contractors specialists or dialogue between them and the site project manager, are there additional questions arising from the pre-ex strip and plan and what samples might be required to address them.

Which samples might be fast-tracked to help gain a good understanding of the site and help further refine the strategy?

4. Mid-point sample strategy review (where appropriate depending on length of work and complexity of site)

This section should be updated following discussion by the client, stakeholders , the contractor and the archaeological contractor on site. Areas that might be covered relate to the following:

What information has been gathered from samples processed to date?

What other questions have arisen during the excavation that sampling might address; what are they and what changes are needed to the strategy; what additional samples are required?

Do any specialist samples need to be taken on site? If so, what, by whom and when? How will these samples address the specific objectives?

Following assessment of 15 samples from the north part of Mitigation Area 2, the environmental information derived was low. Very few ecofacts have been retrieved. There is limited scope to make inferences about the environment or economy from the available evidence.

It is justifiable to reduce sampling intensity in this part of Area 2. This will primarily take the form of restricting most sampling of elongated negative features to their terminus.

There is an expectation that the southern part of Area 2 has greater archaeological potential. The LSWSI (Appendic B, box 2) sampling strategy will be adhered to in the southern part of Area 2 until such point that environmental assessment indicate a change in sampling strategy is warrented.

5. Final additions / amendments to sampling strategy

This section should be completed by the archaeological contractor and their specialists towards the end of the fieldwork, to ensure that all elements of the strategy, including any changes implemented after the mid-stage review are properly captured.

Appropriate reference to the on-site sample register should also be given here so that a full list of samples and the purpose for which they were taken can be easily viewed.

18.4 Appendix 4 Figures

Loading/unloading
Pedestrian crossing
Turning/holding area
First Aid
Smoking
Fire Muster Point
Bat Tree 10m buffer
C31034
5552m2
Topsoil
920m2
Subsoil
996m2
C31039
2529m2
Remote parking area for C31035
Pedestrian Route
C31035
6728m2
Subsoil
908m2
Topsoil
1024m2
C31030
6454m2

Legend

CRID

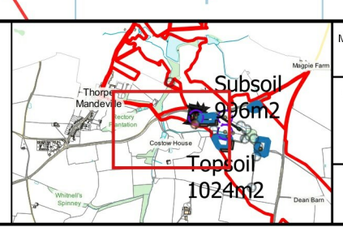
Artificial Badger sett (new)

30m badger sett buffer

Existing Badger Setts

battree10mbuffer

C31030trench



Map Number

Figure 1

Map Name

Thorpe Mandeville
Location Plan

Community Forum Area CFA15

Scale at A3: 1:15,000

0 10 20 30 40

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